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A MANUAL

OF

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²
DYEING RECEIPTS

FOR GENERAL USE.

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BY

³
JAMES NAPIER, F.C.S.

WITH NUMEROUS SAMPLES OF DYED CLOTH AND SILK.

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PREFACE.

IN the 'MANUAL OF DYEING,' the Author often found it necessary, in order to illustrate some chemical principle, to enter into details of practical processes; and when enumerating these processes, he felt convinced that a volume embodying a succinct description how to make the various substances daily in use in the dyehouse would be generally acceptable, and with this view prepared the present Manual of Receipts. The two works will now form a complete *Vade Mecum* for all engaged in the dyeing or renovating of textile fabrics.

These Receipts might have been multiplied almost indefinitely without adding much to the utility of the work; as, for instance, under the colour drab, there might have been given separate receipts for producing all the varieties of tint, and so with almost every other colour; but this has been found altogether unnecessary, as general instructions are given, in most cases, for producing any particular tint, shade, or colour.

PARTICK, GLASGOW,
Jan., 1855.

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DYEING RECEIPTS.

INTRODUCTORY OBSERVATIONS.

IN the 'MANUAL OF THE ART OF DYEING,' we endeavoured throughout the whole Treatise to consider the wants and requirements of the practical man, and therefore confined our remarks more to the principle and the theory of the operations, than to the operations themselves; and when making reference to practical processes, we considered ourselves addressing men equally, if not more conversant with the subject under consideration than we were ourselves. Consequently, except when required to illustrate some fundamental principle, practical processes for dyeing were not given. But our present object is to detail processes; and in so doing we do not consider ourselves writing for practical dyers, nor do we, in every case, profess to give the most recent and economical methods for a dye-house. A receipt that is the best and most economical to-day, may not be so to-morrow, from modifications and improvements introduced as the result of observations, depending, it may be, upon circumstances which no receipt can give. In the present Manual we are supposing ourselves addressing the non-practical reader, or, it may be, the apprentice-dyer, and therefore descend into details of processes, so that any one may be enabled to produce, either for amusement or use, any of the shades or colours required. And although, as already stated, the quantities and particular methods given may not be, in all cases, the most economical for the dye-house, nevertheless, by carefully

following out the instructions given, a good colour similar to the pattern attached will be produced without difficulty, which is all that is in general required by the amateur. The practical dyer will soon economise according to circumstances, while the thrifty housewife will find that very little trouble is necessary for renovating and improving the appearance of many articles of dress and house furnishings, either in Cotton, Silk, or Woollen.

PRELIMINARY PREPARATIONS FOR DYEING.

1. BANDING.

Cotton is generally obtained in bundles of 5 lb. or 10 lb., made up of *heads*, each head having 10 hanks, except when the yarn is very coarse, when each head has only 6 hanks; or very fine, when each head has 20 hanks. The number of heads indicates the grist of the thread called '*the Number.*' Thus, 10 lb. of No. 60 will have 60 heads of 10 hanks, or 30 heads of 20 hanks. These heads are made up into spindles of 18 hanks, by the dyer, and through each spindle is tied a piece of stout thread or twine, termed a band; the bundle, when banded, is divided into 6 quantities, and rolled up and tied into bundles for boiling. Thus, No. 60 will give 35 spindles and 12 hanks, equal to 36, and will be rolled up into 6 sixes, or all sixes, as it is termed, 10 lb. being invariably named a bundle.

Silk is also banded in the same manner as Cotton, using no particular number of hanks, but in quantities convenient for making up into skeins when finished.

Woollen is also banded with twine into spindles, previous to being put under operations for scouring or dyeing.

2. BOILING AND STICKING.

Cotton.—After banding, cotton is boiled in water for two or three hours until thoroughly wet. The bundles are then loosed, and each roll of yarn is put upon a wooden pin about 3 feet in length and about $1\frac{1}{2}$ inches thick, six *pins* or *sticks* forming a bundle according to the division made by the bander.

Silk, as referred to in No. 1, after banding, is carefully tied up and put into fine canvas bags, and boiled in the bags in a strong solution of soap for three or four hours, until all the gum is boiled off. If the silk be yellow gum, it is put upon sticks like the cotton, and wrought in a solution of soft soap, at a temperature just approaching the boiling point, for about one hour, when it is tied up as the white gum silk,

and put into bags and boiled till all the gum is removed ; when boiled, it is washed from the soap, and *sticked* for dyeing, putting six or eight heads of silk on each stick.

Woollen is steeped over night in soap ley, or old alkaline solutions, and then scoured through clean soap to remove all oil or grease that may be upon the wool ; or, what is more common, a scouring liquor is prepared with 1 lb. soft soap and 1 lb. common soda, or $\frac{1}{2}$ lb. soda ash, in 10 gallons water, and scoured through this.

3. COTTON CLOTH.

The cloth is taken out the fold and hanked up by the hand, taking the end through the hank and tying it loosely, technically termed *kinching* ; it is then steeped in old alkaline ley overnight, which loosens and removes the oil, grease, and dressing which it has got in weaving ; it is then thoroughly washed in clean water. Where there is a dash wheel, it should be used for this washing.

4. TO REMOVE OIL STAINS.

When oil spots are upon the goods, and so fixed or dried in, that the steeping will not remove them, rub a little soft soap upon the oil stain, and let it remain for an hour, then rub gently with the hand in a lather of soap, slightly warmed, and then wash in water ; for cotton, a little caustic ley will do equally well for removing the oil, but the soap is a preferable process, and seldom fails. It is essential that all oil or grease be removed before dyeing.

5. TO REMOVE IRON STAINS.

Take a little muriatic acid in a basin or saucer and make it slightly warm, then dip the iron stain into the acid for about one minute, which will dissolve the oxide of iron, the cloth must be well washed from this, first in water, then in a little soda and water, so as to remove all trace of acid. A little oxalic acid may be used instead of muriatic acid, but more time is required, and with old fixed spots is not so effective. The same precautions are necessary in

washing out the acid, as any acid dried in the cloth injures it.

6. TO MAKE BLEACHING LIQUOR.

Take a quantity of bleaching powder, and add to it as much water as will make it into a thin cream, take a flat piece of wood and break all the small pieces by pressing them against the side of the vessel, then add two gallons of cold water for every pound of powder; stir well, put a cover upon the vessel, and allow the whole to settle. This will form a sort of stock vat for bleaching operations.

7. TO BLEACH COTTON YARN FOR DYING.

A vessel sufficiently large to allow of the cotton being wrought in it freely without pressing is to be filled about two-thirds with boiling water; add a pint of bleaching liquor from No. 6 for every gallon of water in the vessel, then work the yarn in this for half an hour. Into another vessel of similar size, filled two-thirds with cold water, add a wine-glass full of vitriol for every two gallons of water; stir well, and then put the yarn from the bleaching solution into this and work ten minutes, and then wash from this until all acid is removed.

8. TO BLEACH COTTON YARN TO BE FINISHED WHITE.

The yarn when banded is boiled for three hours in caustic lye, either potash or soda, made by adding 1 gill of the caustic lye No. 11 or 12 for each gallon of water in the boiler; wash well from this lye, and lay the yarn to steep in a bleaching liquor, made up as No. 7, but with cold water; after four or five hours, lift and steep for an hour in a sour of 1 wine-glass full of vitriol to the gallon water, lift and wash well, then boil again in a lye of half the strength of the first for two hours, and wash from this and steep again four hours in bleaching liquor; wash from this and steep for an hour in a clean sour; wash well from this, and dry. A little smalt blue is put into the last washing water to clear the white.

9. TO BLEACH COTTON CLOTH.

Rot steep, as No. 10, and wash, then boil in caustic lye, of the strength of 1 gill of No. 11 or 12 to the gallon water, for three hours; wash out the boil and steep in bleaching liquor for six hours, same strength as No. 8; wash, and steep an hour in a strong sour of one wine-glass full of vitriol to the gallon of water; wash well from this before drying or dyeing. If the cloth be very heavy, one operation may not be enough; in such cases proceed from the beginning as No. 8, giving two operations.

10. TO ROT STEEP.

Lay the cloth in spent lyes that have been used for boiling, for at least overnight; if no spent lye be convenient, add to water, at about the heat of the hand, as much soda or potash as will make the water perceptibly alkaline, known by the soft feel the water has on the hand; wash well from this steep. This liquor often ferments with the dressing of the cloth, hence the name *rot steep*.

11. TO MAKE CAUSTIC POTASH.

To 3 gallons of water add 2 lb. either black or pearl ashes and boil; when boiling, add newly slaked lime, until a small quantity taken out does not effervesce when an acid is added to it. To do this, take a tumbler half filled with cold water, take out a tablespoonful of the boiling lye, and put into the tumbler, and add a few drops of sulphuric acid; were sulphuric acid added to the hot lye, it would spurt up, and endanger the operator. When the addition of acid causes no effervescence, the boiling and adding of lime is stopped, and the whole allowed to settle; then remove the clear into a vessel having a cover, to prevent it taking carbonic acid from the air. This serves as a stock for general use. The lime sediment remaining may have some hot water added, which will give a strong lye, and may be used for first boils for yarn or heavy cloth.

12. TO MAKE CAUSTIC SODA.

For every gallon of water add 1 lb. of soda ash, or 2 lb.

of crystallised soda of the shops; boil, and then add slaked lime, and proceed otherwise as with No. 11.

13. TO SLAKE LIME.

Take some well and newly-burned limestone, and pour over it some water so long as the stone seems to absorb it, and allow it to stand; if not breaking down freely, sprinkle a little more water over it. A small quantity is best done in a vessel, as an old cask, in which case it may be covered with a board or bag. Slaked lime should not stand long exposed.

14. TO MAKE A SOUR.

To every gallon of water add 1 gill of vitriol, stir thoroughly; goods steeped in this should be covered with the liquor, as pieces exposed become dry, which deteriorates the fibre; if left under the liquor, the cloth is not hurt by being long in the sour.

15. TO MAKE NITRATE OF IRON.

Take 4 parts, by measure, nitric acid (aqua fortis), and 1 part water, put the vessel into a warm place, and add by degrees pieces of iron so long as it continues to dissolve the metal with effervescence, then take out any remaining iron, and after settling for an hour, pour off the clear, and preserve from light. The solution has a brownish colour, and syrupy consistence.

N.B.—The fumes given off during the operation destroy animal and vegetable tissues, and corrode metals.

16. TO MAKE ACETATE OF IRON (*Black Iron Liquor.*)

Put pieces of iron, or filings, into crude vinegar, and allow it to stand for several days, stirring occasionally; a gentle heat assists the action.

This liquor is sold prepared, and may be obtained of any druggist.

17. TO MAKE SULPHATE OF IRON (*Copperas*.)

Into a glass or stoneware vessel put 2 parts, by measure, of sulphuric acid (vitriol), and 1 part water, and add small pieces of iron, or filings, as long as they are dissolved, then decant the clear liquid into a basin, and evaporate by a gradual heat, until a skin or pellicle be seen forming on the surface of the liquid, remove the heat, and when cool, sulphate of iron is crystallised at the bottom. This salt is sold cheap by drysalters.

18. TO MAKE PROTO-CHLORIDE OF IRON (*Muriate of Iron*.)

To 4 parts of muriatic acid add 2 parts water, and apply a gentle heat, then add iron, in pieces or filings, so long as it continues to be dissolved, then pour off the clear into a basin and evaporate, as No. 17, when greenish-coloured crystals of chloride of iron will be obtained; but this salt crystallises with difficulty, and deliquesces in the air, and should not be exposed. Instead of evaporating and crystallising, the solution may be put into a bottle and reserved for use.

19. TO MAKE PER-SULPHATE OF IRON.

Take some nitrate of iron, No. 15, and add to it carbonate of soda or potash in solution; so long as there is a precipitate, wash the precipitate, which is easily done by using a large vessel for the operation, filling it up several times with water, and when the precipitate settles, decanting off the clear; when washed, some vitriol is added and heat applied, which dissolves the precipitate, and forms per-sulphate of iron.

20. OTHER METHODS.

Take 2 parts vitriol, and 1 nitric acid, and 2 water, and add iron so long as it is dissolved, applying heat; take the clear solution and bottle up for use.

To 4 oz. of copperas dissolved in water, add $\frac{1}{2}$ oz., by measure, of nitric acid, and boil the solution for about one minute.

Instead of nitric acid, add $\frac{1}{2}$ oz. of nitrate of potash (nitre)

and a few drops of vitriol; bring the whole to a boil, when the proto-sulphate of iron is converted into a per-sulphate.

These salts are not generally sold by drysalters.

21. TO MAKE PER-CHLORIDE OF IRON (*Per-muriate of Iron.*)

Take 3 parts of muriatic acid and 1 part nitric acid, with 2 parts water, and add iron so long as it continues to be dissolved; the clear solution is then to be decanted and bottled for use.

It may be formed also by precipitating the iron from the nitrate by soda, and dissolving the precipitate in muriatic acid, in the same manner as No. 20.

22. TO MAKE SULPHATE OF ZINC (*White Vitriol.*)

Take 2 parts vitriol and 1 part water, and add to the mixture metallic zinc, granulated, so long as it continues to be dissolved; decant the clear into a basin, and evaporate by heat until a skin appears on the surface, then lay aside to cool, when there will be obtained crystals of sulphate of zinc. They are white and transparent. This salt is very abundant in the market.

23. TO MAKE SULPHATE OF COPPER (*Blue Stone.*)

2 parts strong vitriol and 1 part water are put into a glass flask, there is then added a quantity of copper turnings or filings, and the whole kept boiling for a considerable time, then decant the solution into a basin, and set aside to cool, when blue crystals of sulphate of copper will be obtained. This salt is plentiful in the market.

N.B.—The gas given off when making this salt should not be allowed to escape into a room; indeed, the dissolving of metals in acids should always be done in such situations that the gases evolved be carried up a chimney.

24. TO MAKE NITRATE OF COPPER.

To 1 part, by measure, strong nitric acid and 2 parts

water add metallic copper so long as the acid dissolves it. The clear solution is put into a bottle and preserved for use. By evaporating, as No. 22, crystal will be obtained, but with difficulty. Dyers themselves generally prepare this salt.

25. TO FEATHER TIN OR ZINC (*Granulate.*)

Take the best grain tin, and melt in an iron pot or ladle, and then pour it gently from a height of several feet into a large vessel filled with cold water. The metal is formed into thin flakes, and is in this state easily dissolved.

Zinc may also be granulated by the same process.

26. PROTO-CHLORIDE OF TIN (*Crystals of Tin.*)

Take 3 parts muriatic acid and 1 part water into a glass or stoneware vessel, and place it so that the acid be raised to a temperature of nearly 200°; add to this acid feathered tin from time to time, so long as it continues to be dissolved, then withdraw the heat, and let the solution cool gradually, when there is obtained the crystals of tin, which are to be collected and dried at a moderate heat, and bottled tightly to prevent deliquescence. This is sold by dry-salters.

27. TO MAKE BI-CHLORIDE OF TIN.

Take 1 oz. of proto-chloride of tin (crystals of tin) and dissolve in 5 oz. of water, in which is put $\frac{1}{2}$ oz. muriatic acid; bring this to boil, adding cautiously, and drop by drop, nitric acid, until no effervescence or nitrous fumes are produced by its addition. Allow to cool, and then bottle for use.

By heating barwood spirits, or plumb spirits, and treating in the same manner, bi-chloride will be produced. As the nitric acid put into the spirits causes rapid effervescence, a large vessel should be employed for this operation.

28. ANOTHER METHOD FOR PER-MURIATE OF TIN.

Take 2 parts of muriatic acid and 1 part nitric acid, add

to this feathered tin, gradually as dissolved, keeping the acid warm. Red nitrous fumes are evolved in this operation. Three ounces of tin to every pound of mixed acids, forms a good spirit.

29. RED SPIRITS.

Take 3 parts, by measure, of muriatic acid and 1 part nitric acid with 1 water; put the vessel containing the mixture into a cool place, and add, in small quantities at a time, feathered tin, using in the proportion of 2 oz. of tin for each pound of acid. A few hours after the action has ceased, the spirits are ready for use.

N.B.—In making spirits the best sort of vessels to use are salt-glazed stoneware.

30. TO MAKE YELLOW SPIRITS.

To every 3 parts of muriatic acid add 1 part sulphuric acid and 1 water; add to this, by degrees, feathered tin, so long as it continues to be dissolved, keeping the solution at a temperature of about 60°; decant and preserve for use.

31. BARWOOD SPIRITS.

Take 5 parts, by measure, muriatic acid and 1 part nitric acid; add to this, by degrees, 1 oz. of feathered tin for every pound of the mixed acid. This spirit should stand for a day before being used.

32. PLUMB SPIRITS.

Take 6 parts, by measure, muriatic acid and 1 part nitric acid and 1 part water; keep the vessel in a temperature of about 60°; for every pound weight of the acids add by degrees 1½ oz. tin. This spirit should stand a day before being used.

33. TO MAKE A PLUMB TUB.

Make a decoction of logwood by boiling; if the wood be

ground, half an hour's boiling will do, but if chipped, two hours, using $1\frac{1}{2}$ lb. best logwood for every gallon water; after boiling has ceased, and the wood settled, decant the clear decoction and allow it to stand for forty-eight hours; again decant from any matter that may have settled to the bottom, and to every gallon of the decanted liquor add from 1 to $1\frac{1}{2}$ lb. of plumb spirits. Stir well, and after standing for a day it is ready for use.

34. ALUM PLUMB TCB.

Make a decoction of logwood of 1 lb. to the gallon water, by boiling; when the wood is settled, remove the clear decoction, and to each gallon add 1 lb. of alum. The alum should be previously dissolved to saturation. When well stirred and standing for a day, the plumb tub is ready for use.

35. PEACHWOOD PLUMB.

Make a strong decoction of Lima or Brazil-wood by boiling, using at the rate of 1 lb. wood to the gallon water. When the boiling has ceased and the wood settled to the bottom, decant the clear and allow it to cool for twenty-four hours, then decant again from any sediment that may have collected, and to every gallon of liquor add half pint plumb spirits No. 32, stir well, and let stand for several hours, when it is fit for use.

36. TO MAKE UP A BLUE VAT.

Take 1 lb. of indigo, and grind in water until no grittiness can be felt between the fingers; put this into a deep vessel (casks are generally used), with about 12 gallons of water, then add 2 lb. copperas and 3 lb. newly slaked lime, and stir for fifteen minutes; stir again after two hours, and repeat every two hours for five or six times; towards the end, the liquor should be of a greenish-yellow colour, with blackish veins through it, and a rich froth of indigo on the surface. After standing eight hours to settle, the vat is fit to use.

37. TO PREPARE ANNOTTA.

Into 2 gallons of water put 1 lb. annotta, 4 oz. pearl ash and 2 oz. soft soap, and apply heat, and stir until the whole is dissolved. When convenient, it is best to boil the solution.

38. TO PREPARE CATECHU.

To 7 or 8 gallons of water put 1 lb. of catechu, and boil till all is dissolved, then add 2 oz. of sulphate of copper, and stir, when it is ready for use. Nitrate of copper may also be used.

39. TO MAKE DECOCTIONS OF WOODS.

On a piece of coarse cloth stretched upon a frame or laid into a basket, put the ground wood, and place it over a vessel, then pour over the wood boiling water, until the water pass through nearly colourless. If the wood be chipped, it must be boiled.

40. TO MAKE SULPHATE OF INDIGO.

Into 5 lb. of the most concentrated sulphuric acid, stir in by degrees 1 lb. of the best indigo finely ground; expose this mixture to a heat of about 160° Fah., for ten or twelve hours, stirring it occasionally; a little rubbed upon a window pane, should assume a purple-blue colour.

41. TO PREPARE INDIGO EXTRACT.

Sulphate of indigo is prepared as No. 39, and then diluted with about 4 gallons of hot water, and the whole put upon a thick woollen filter, over a large vessel, and hot water poured upon the filter, until it passes through nearly colourless; the blackish matter retained upon the filter is thrown away, and the solution passed through is transferred to a leaden vessel, and evaporated to about 3 gallons, to which is added about 4 lb. common salt, and well stirred; the whole is again put upon a woollen filter, and allowed to drain. The extract remains as a thin pasty mass upon the filter, and is ready for use.

42. TO MAKE CHEMIC.

Into a cask containing about 20 gallons of boiling water, (the cask should not be over three-thirds full,) add 1 lb. of indigo made into sulphate or extract, then add by degrees, ground whiting, stirring after each addition, and continue until the acid of the indigo is exactly neutralised, which is generally known by the taste ceasing to be sour; if there be more whiting added than will neutralise the acid, the colours dyed with it will be faulty. The whole should stand for eight or ten hours to settle after adding the whiting, when it is ready for use.

Carbonate of soda may be used instead of whiting, with the same precautions. As a quantity of sediment collects at the bottom of the vessel, care has to be taken to avoid this in use.

43. TO PREPARE SAFFLOWER FOR DYEING COTTON.

Take 1 lb. of safflower, and immerse in cold water until perfectly wet, and the fibres all loose, then place it on a fine hair-cloth search, and pour upon it clean cold water, until the water passing through is not tinged yellow. Dissolve 1 oz. of pearl ash in 2 gallons water, then add the washed safflower, and stir and allow it to stand for five or six hours, after which the whole is again put on the search, placed over a clean vessel to retain all the liquid passing through which contains the dye. After pouring a little clean water upon the exhausted safflower in the search to wash out any dye, it is thrown away.

This dyeing liquor spoils by keeping, and should be used when newly prepared.

44. TO PREPARE SAFFLOWER FOR DYEING SILK.

Into the liquid as prepared in No. 42, is put 2 oz., by measure, of vitriol, well stirred, and a quantity of cotton put in and allowed to steep for a few hours; the colouring matter is imbibed by the cotton, which is dyed a deep red. The cotton is now well washed in cold water, and wrought for fifteen minutes in a vessel with cold water, having dissolved in it 1 oz. pearl ash; wring the cotton from this, and the solution is ready for dyeing silk.

45. TO MAKE OXALATE AND MURIATE OF TIN.

Dissolve 2 oz. of crystallised bin-oxalate of potash, then add 1 oz. of crystals of tin, and stir till dissolved.

It is also prepared by adding to a pint of red spirits 2 oz. bin-oxalate of potash, and stirring until it is dissolved; or the oxalate may be dissolved in water before adding it to the spirits.

46. TO MAKE ACETATE OF ALUMINA (*Red Liquor.*)

Into 1 gallon hot water dissolve 2 lb. alum; dissolve, in a separate vessel, 2 lb. acetate of lead (sugar-of-lead) in 1 gallon water; in a third vessel dissolve $\frac{1}{2}$ lb. crystallised soda, mix all the solutions together, and stir well for some time, then allow to stand overnight; decant the clear solution, which is ready for use.

This mordant is obtained from drysalts.

47. TO TEST WATER.

Take a small piece of white soap, and dissolve in alcohol and let it clear; if a little of this clear solution is added to distilled water there is no precipitate, but if the water be hard it becomes milky; the hardness of the water may be known by the amount of milkiness, or precipitate given.

By taking a little of the water in a clean glass, and adding the following tests, using a separate quantity of water for every test, the presence of the following ingredients, which generally exist in water, will be ascertained:—

Tests used.	Indicate the presence of
If oxalate of ammonia gives a whiteness,.....	Lime, free or combined.
If blue litmus is turned red,	
If turmeric turns brown,...	Acids, uncombined.
If nitrate of silver white, and not cleared by the addition of nitric acid,.....	Alkalies and alkaline, earths.
If salts of barytes white, not cleared by adding nitric acid,.....	Muriatic acid, free or combined.
	Sulphuric acid and sulphates

Tests used.	Indicate the presence of
If lime-water milkiness, ...	Carbonic acid.
If acetate of lead becomes black,.....	Sulphurets.
If chloride of calcium gives white, ...	
If phosphates of soda give white after long stirring, }	Carbonated alkalies.
	Magnesia.

Carbonates of the earths, sulphates, muriates, and free acids make water hard.

48. TO MAKE LIME WATER.

Into a barrel or other deep vessel filled with cold water add new-slaked lime in the proportion of $\frac{1}{4}$ lb. to the gallon water, then stir well and allow to settle; the clear is what is used for dyeing. This should be made up just previous to using, as lime water standing attracts carbonic acid from the air, and forms an insoluble crust on the surface, which tends to weaken the solution.

49. TO MAKE COCHINEAL LIQUOR OR PASTE.

Take 8 oz. ground cochineal into a bottle, and add to it 8 oz., by measure, ammonia, and 8 oz. water, let the whole simmer together for a few hours, when the liquor is ready for use.

50. REMOVE MILDEW FROM COTTON.

Proceed with the stains by rubbing in soap or steeping in a little soda, washing, and then steeping in bleaching liquor same as No. 7; afterwards pass through a sour, and wash.

51. TO REMOVE INDELIBLE INK MARKS.

Steep the marking in a little chlorine water or a weak solution of bleaching liquor for about half an hour, then wash in ammonia water, which will remove the stain; the goods to be washed from this in clean water.

52. ANOTHER METHOD.

Spread the cloth with the ink mark over a basin filled with hot water, then moisten the ink mark with the tincture of iodine, and immediately after take a feather and moisten the parts stained by the iodine, wash in a solution of hyposulphate of soda, or caustic potash or soda, until the colour is removed, then let the cloth dip into the hot water; after a while wash well, and dry.

53. TO DETECT ANIMAL AND VEGETABLE FIBRES.

Treat the fabric with bi-chloride of tin heated to from 130° to 150° Fah., when the cotton and linen become black, and wool and silk remain unchanged.

54. TO DETECT MIXED FABRICS OF COTTON AND WOOL.

Dip a piece of the suspected cloth in bleaching liquor: after a little the woollen turns yellow and the cotton white, and consequently may be easily distinguished.

55. TO DETECT COTTON IN LINEN.

The piece to be tested is boiled, to remove all dressing, and then dried; a portion of the piece is put into common vitriol for about one minute, it is then taken out, washed in water several times, and then in a weak solution of soda or potash, and all gummy matter formed is removed by gentle rubbing; by this process the cotton is dissolved out and the linen remains, or what portion of the cotton is not dissolved becomes opaque white, the linen is transparent, and is thus easily detected. By comparing the portion of cloth immersed with a similar portion not tried, the quantity of cotton present may easily be estimated.

56. ANOTHER METHOD FOR DETECTING COTTON IN LINEN.

Take a small piece of the cloth, boil in water and dry; then take 3 parts, by weight, of vitriol and 2 parts of crushed nitrate of potash (nitre), and the dry piece of cloth is put into this for six or seven minutes, and then washed from

this till there is no taste of acid, and dry at a gentle heat, then put it into a mixture of ether and alcohol, which will dissolve the cotton and not the linen. If the piece be weighed before putting into the ether and ~~alcohol~~ and after, the quantity of cotton in the fabric may be thus ascertained.

57. COTTON AND WOOL.

Take a small piece of the cloth and boil in caustic soda, No. 12, when the wool will be dissolved and the cotton remain. If the threads have been previously counted, their relative mixture may be thus ascertained.

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58. COTTON WITH SILK AND WOOL.

Put a piece of the cloth into chlorine water or bleaching liquor No. 6. The cotton is whitened by the liquor, and the silk and woollen become yellow. These changes will be easily distinguished by the use of a small pocket lense.

59. COTTON WITH SILK AND WOOLLEN.

Take a small piece and unravel the threads, and inflame them; the cotton burns away freely, with little or no black charcoal; the woollen and silk shrivel up, leave a black charcoal, and give a strong smell.

60. DOUBLE MURIATE OF TIN.

This is prepared exactly as No. 26, but is not crystallised. Dissolve 5 oz. tin in every pound weight of muriate acid, which gives the strength at which it is generally sold.

61. SINGLE MURIATE OF TIN.

Take 2 parts acid and 1 part water, and add to this 3 oz. of tin for every pound weight of acid; dissolve in the same manner as No. 26.

Both these liquors are sold by drysalters.

62. SOFTENING.

Into a gallon of hot water dissolve $\frac{1}{2}$ lb. of common soda, then add half pint sweet oil, and stir well. A little of this is added to the washing water for some colours, to soften the goods; it is only applied to yarn.

COTTON DYEING

GENERAL DIRECTIONS.

IN the following receipts for Cotton, the quantity of dyestuffs given is for dyeing 10 lb. weight of goods, whether cloth or yarn; so that the proportions of the dyedrug may be easily calculated for any particular quantity. When only small quantities of goods are to be dyed, such as ribbons, gloves, handkerchiefs, or a dress, the proportion of dyestuffs may be increased with good effect, as very small quantities cannot be done with the same economy.

The quantities given in these receipts, in connection with a pattern, must be looked upon as a close approximation only, there being so many circumstances to consider, that positive quantities cannot be given; for instance, the quality of the fabric, the water, and the dyedrugs, are often so varied, as to require a difference of one-half more or less of the stuff to produce the same effect. However, the amateur will find, that in following out any of the receipts, he will not fail to produce the colour required, if not the exact tint. Thus, suppose it is wished to dye a brown of any particular sort, say cinnamon brown, No. 68, by following the mode and using the quantities given in the receipt, a brown of that quality will be produced; but should he wish to dye a brown of the *exact tint* and *depth* of any pattern in the book, the quantities of stuff used may not produce that, owing to the goods, stuff, or water, as already stated, not being the same as were used for the pattern in the book. Nevertheless, by following the instructions given in relation to the principle and reaction of the different stuffs used for the dye, the amateur may be able to add such stuff as will ultimately bring up the particular tint required. As, for example, logwood gives the violet or blue tint, lima or peachwood the red or crimson tint, and fustic or bark the yellow tint.

I have already referred to the preparation of cotton, silk,

and woollen, for dyeing, which should be carefully attended to, otherwise the experiments will not be successful.

It may be further remarked, that in giving receipts, the exact quantity of water cannot be stated, as that will vary according to the nature of the article to be dyed, shape of vessel, etc.; but in all cases the quantity of water should be sufficient to allow the goods being put under the liquor without being closely pressed.

For re-dyes, if the colour upon the goods be light, and that required be dark, then it may not be necessary to remove it, but only to steep in a little alkali, as soda, to remove grease or oil. In general, it is better to clean the goods throughout, and for this purpose, put them through the bleaching process, No. 9.

It may also be stated, as a general rule, that for all light shades of colour, the cotton should be previously bleached, otherwise the colour will not give satisfaction. The following will be a sort of guide:—All safflower colours, light yellows, sky blues, lavenders, nankeens, light greens, very light drabs, etc., should be bleached; dark drabs, browns, reds, slates, ambers, deep blues, black, dark greens, etc., need not be bleached.

All washing processes, except where otherwise mentioned, are in cold water.

DYEING.

63. BLACK.

Steep the goods in a decoction of 3 lb. sumach while it is hot, and let them lay overnight; wring out and work for ten minutes through lime-water, No. 48, then work for half an hour in a solution of 2 lbs. copperas. They may either be washed from this or wrought again through lime-water for ten minutes—the former gives the preferable shade, but must be well washed; work them for half an hour in a warm decoction of 3 lb. logwood, adding half pint chamber lye; before entering the goods, lift and raise with 2 oz. copperas in solution; work ten minutes, then wash and dry.



64. JET BLACK.

The goods are proceeded with exactly as last; but along with the logwood is added 1 lb. fustic, and finished as above.

In both these blacks, if 3 pints iron liquor, No. 16, be used instead of the copperas, or in part mixed with the copperas, it makes a richer shade of black, but copperas is most generally used; if mixed, use half the quantity of each.

65. BLUE BLACK.

Dye the goods first a good shade of blue by the vat, No. 36, and then proceed exactly as No. 63; but should the blue be very deep, as is often the case, then half the quantity of the materials given for No. 63 will suffice.

66. SPIRIT BROWN.

The goods are dyed first a spirit yellow, exactly as No. 92, and washed; they are then wrought for half an hour in a decoction of 2 lb. lima or peachwood and 1 lb. logwood; lift up and add 3 oz. of alum in solution, and work fifteen minutes; wash and dry. By varying the proportions of logwood and limawood, a variety of shades can be produced.

67. MORDANT BROWN.

Dye a yellow, the same as No. 90, then work for half an hour through a decoction of 2 lb. limawood and 8 oz. logwood, lift and raise with 2 oz. alum in solution; work for fifteen minutes, and wash and dry.

This method is well adapted for cloth goods, is better than the spirits, and more easily performed by the non-practical man. The spirit brown is best for yarn.

68. CINNAMON BROWN.

Dye a dark yellow, the same as No. 92, then work for twenty minutes in $3\frac{1}{2}$ lb. limawood and $\frac{1}{2}$ lb. logwood; then raise, by adding 2 oz. of alum in solution; wash in cold water, and dry.

69. UVANTERINE BROWN.

Dye a yellow, the same as No. 92, and then work for twenty minutes in a decoction of 1 lb. limawood and 1 lb. fustic; lift and raise, by adding half pint red liquor, No. 46; work ten minutes in this; wash in cold water, and dry.

70. FAWN BROWN.

Take 1 part annotta liquor, No. 37, and 1 part boiling water; stir well, and work the goods in this for ten minutes; wring out and wash in two waters; then work for twenty minutes in a decoction of 2 lb. fustic and 1 lb. sumach; lift and add 3 oz. copperas, in solution; stir well, and work for twenty minutes longer; wash from this in two waters; then work for twenty minutes in a decoction of 8 oz. limawood, 8 oz. fustic, and 4 oz. logwood; lift and raise with 1 oz. alum; work ten minutes; wring out, and dry.

71. CARBON BROWN.

Work the goods at a boiling heat for two hours, or steep for several hours if the liquor is allowed to cool, in 2 lb. catechu, prepared as No. 38; wring out, and then work for half an hour in a hot solution of 6 oz. bi-chromate of potash (chrome); wash from this in hot water. If a little soap be added to the washing water, the colour is improved.

Any depth of shade of brown may be dyed by repeating the operation.

72. CATECHU CHOCOLATES.

Dye a brown, as No. 71, then work fifteen minutes in a decoction of $1\frac{1}{2}$ lb. logwood; lift, and add 3 oz. alum, in solution; work ten minutes longer; wash out, and dry.

By this process, a great variety of browns and chocolates may be produced, both by using different quantities of logwood, and by different depths of brown before the logwood is applied.

73. CHOCOLATE OR FRENCH BROWN.*

Dye a yellow, as No. 92, then work for half an hour in a decoction of 3 lb. logwood; lift, and raise with half a pint of red liquor, No. 46, and work ten minutes longer; wash and dry.

Another shade of deeper chocolate will be obtained by adding 1 lb. fustic with the logwood.

74. CATECHU FAWNS.

Work the goods fifteen minutes in hot water, to which has been added 2 pints of the catechu, No. 38; wring from this, and work fifteen minutes in hot water, in which has been dissolved 1 oz. of chrome, bi-chromate of potash; wash from this, and dry.

75. CATECHU FAWNS.—ANOTHER METHOD.

Work in the solution of catechu the same as No. 74; wring out, and then work for fifteen minutes in warm water,

to which has been added 2 oz. acetate of lead previously dissolved; wash in cold water, and dry.

76. CATECHU FAWNS.—ANOTHER METHOD.

Work for fifteen minutes in warm water, to which has been added 4 pints of catechu, No. 38; lift, and add 2 oz. copperas in solution, and work for other fifteen minutes. Wash from this in one tub water, and finish through warm water, in which as much soap has been dissolved as will raise a lather, and dry out.

77. SAFFLOWER PINK.

2 lb. of safflower prepared as No. 43, adding as much water with the safflower liquor as will be sufficient for the quantity of goods; work in this for five minutes, and lift out, taking care not to lose any of the liquor, and add about 1 gill of sulphuric acid. The liquor should taste decidedly acid. Enter the goods in this, and work an hour; wring out, and wash in three separate waters; but in the last water there is to be put as much cream tartar in solution as to be perceptible to the taste; wring from this, and dry in the air, or in a very dry heat, carefully avoiding steam or the sun's rays, which affect the colour. The cream tartar should be dissolved in boiling water before adding.

78. ROSE COLOUR.

Prepare 4 lb. of safflower as No. 43, then proceed to dye exactly as No. 77; the vitriol to be added to the safflower in sufficient quantity to give the liquor a sour taste; work an hour, or until a drop of the liquor upon the point of the finger, held between you and the light, has no reddish tint; wring out, wash, and finish as above.

79. SAFFLOWER CRIMSON.

Prepare 7 lb. safflower as No. 48, and then proceed as No. 78; it may be requisite to lift once or twice during working, and add each time 1 glass of vitriol; the acid taste should always prevail. This colour requires to be wrought for several hours before all the red colouring matter of the safflower is taken up. It also requires an extra tub of water in washing.

80. SAFFLOWER RED.

Into a tub of warm water add two imperial pints of annotta, No. 37, and work the goods through this for twenty minutes; wring out, and then proceed to dye with 6 lb. of safflower, in every way as No. 79, and finish in the same manner.

81. SAFFLOWER SCARLET.

Dye a deep orange with the annotta solution, No. 37, about one measure water to one measure annotta; wring out, wash from this, and then work in 7 lb. of safflower,

No. 43, and proceed exactly as in No. 79 for crimson, and finish in the same manner.

The annotta liquor used for this should not be thrown away, as it will serve again either for this or other light shades.

82. COMMON RED.

Boil or *scald*, No. 39, 3 lb. sumach; put the goods into this as soon as possible after the grounds settle or the liquor is decanted, and let them steep till the liquor is cold, say over night; wring out, and work for an hour in red spirits diluted to from 2° to $2\frac{1}{2}^{\circ}$ Twaddell's hydrometer, or about 1 gill spirits, No. 29, to each gallon water; wring out, and wash well, and make a decoction, No. 39, of 3 lb. limawood and 1 lb. fustic; work the goods in this for half an hour at a heat that the hand may be held in without pain, lift up and raise by adding 1 gill red spirits, No. 29; return the goods, and work fifteen minutes longer; wash out, and dry.

83. BARWOOD RED.

Boil 2 lb. sumach, and then decant the clear and add a wine-glass full of vitriol, and steep the goods in this decoction for at least six hours; wring out and work in spirits, No. 31, diluted to $2\frac{1}{2}^{\circ}$ Twaddell, for an hour; wring out and wash, then pass through a tub of warm water; put 10 lb. of barwood into a boiler with water, and bring it near to the boil, into which the goods are entered and wrought amongst the wood grains for about three-quarters of an hour; lift out, wash, ring, and dry. Deeper shades may be dyed by using greater quantities of stuffs in each operation.

COTTON DYEING.

84. COMMON CRIMSON.

5 lb. sumach are boiled or scalded, No. 89, and the goods steeped in it overnight, and then spirited at 2° Twaddell, same as No. 82; wash and work through a decoction of 3 lb. limawood and 1 lb. logwood, for thirty minutes, then raise with a gill red spirits, No. 29; work for fifteen minutes more; wash out, and finish.

By using only limawood without logwood, a beautiful red crimson is obtained, and by varying the proportions and quantities, a great variety of tints will be dyed by the same proportion of sumach and spirits.

85. LIGHT STRAW.

To a tub of cold water add 4 oz. of acetate of lead (sugar of lead), previously dissolved, work the goods through this for fifteen minutes, and wring out; into another tub of water add 2 oz. bi-chromate of potash (chrome); work the goods through this ten minutes, wring out, and pass again through the lead solution for ten minutes; wash, and dry.

86. LEGHORN.

Proceed and finish exactly as No. 85, but along with the chrome add $\frac{1}{2}$ pint annotta liquor, No. 37.

Different depths and tints may be obtained by using more or less of these stuffs, without varying the mode of working.

87. LEMON YELLOW.

Into a tub of cold water put 1 lb. of acetate of lead (sugar of lead), previously dissolved; work the goods in this for fifteen minutes, and wring out; into another tub of

cold water put 6 oz. bi-chromate of potash in solution ; work the goods for fifteen minutes through this, and wring out ; then put back, and work ten minutes in the lead solution ; wring out, wash, and dry.

88. CHROME YELLOW.

Proceed and finish exactly as No. 87, but using twice the quantity of stuff ; or with the same quantity of stuff, passing the goods twice through the chrome and lead, and finishing out the lead as described ; by these means any depth of yellow may be dyed with lead and chrome.

89. CHROME AMBER.

To a tub of cold water add 1 lb. acetate of lead and 1 lb. nitrate of lead in solution ; work the goods in this for half an hour and wring out, then in a tub of warm water add 12 oz. chrome, and work the goods from the lead through this for fifteen minutes ; expose to the air for half an hour, then pass again through the lead and chromé, working the same time in each as before, and allow an hour's exposure out the chrome the second time ; then pass through the lead ; wring out, and wash and dry. A third dip may be given, if not deep enough, observing the same rules.

90. ANOTHER METHOD FOR DARK YELLOWS.

Into a tub of water add 1 lb. acetate of lead, and to this add gradually caustic potash or soda, Nos. 11 and 12, until the precipitate formed be re-dissolved, taking care not to add more caustic alkali than is required for this solution. The goods are then wrought through this for half an hour; wring out, and then add 8 oz. chrome in another tub of water, and work the goods in this for fifteen minutes; wring out, and wash and dry. 2 or 3 oz. of sulphate of zinc may be added to the chrome solution with good effect. If a red deep amber be required, add to the chrome solution $\frac{1}{2}$ pint muriatic acid.

91. ANOTHER METHOD FOR AMBER.

Into a tub of water add 2 lb. acetate of lead, in solution, and $\frac{1}{2}$ pint muriatic acid; work the goods in this for fifteen minutes; wring out, and work for ten minutes in another tub of water, having dissolved in it 6 oz. chrome: wring out, and wash and dry.

92. SPIRIT YELLOW.

Steep or lay the goods in a decoction of 3 lb. sumach, as No. 82; lift and wring out, and then work in the spirit, either No. 29 or 30, diluted to 2° Twaddell, for half an hour; then wash out. Into a coarse canvas bag put $\frac{3}{4}$ lb. quercitron bark, and put this into a copper boiler with as much water as will allow the goods to be wrought in easily, and boil for half an hour; remove the bag with the bark, and work the goods in the decoction for fifteen minutes; lift and add 1 pint of yellow spirits, No. 30, or red spirits, No. 29; work in this for half an hour; wash out till no taste of spirits is felt, and dry. An iron vessel will not do for this operation.

93. LIGHT SPIRIT YELLOW.

Work the goods through the spirits, No. 29 or 30, made down to 2° Twaddell, for half an hour, without being previously sumached; then wash out and dye with the bark, prepared as No. 92; proceed in the same manner, by adding the spirits, washing, and finishing.

94. BARK YELLOW WITH MORDANT.

Work the goods for ten minutes in red liquor, No. 40, made to 8° Twaddell; wring out and wash in a tub with hot water; then work through a decoction of 2 lb. bark, No. 39, for half an hour; lift and add a pint of red liquor, No. 46; work fifteen minutes, and wash and dry.

95. CHROME ORANGE.

Boil 2 lb. of brown acetate of lead and 1 lb. of letharge in 3 gallons of water for an hour; take two-thirds of the clear solution into a tub of cold water, and work the goods in this for fifteen minutes; wring out, and work through lime-water, No. 48, for ten minutes; wring out, and put back into the lead tub; work other fifteen minutes, and wring out and give another tub of lime-water; then back again to the lead, previously adding the remaining solution of lead to it; after fifteen minutes' working, wring out, and work ten minutes through a tub of water with 1 lb. of chrome dissolved in it; wring out, and pass again through the lead and chrome as before; then work in lime-water heated to the boiling point, when the orange colour is obtained; then wash through a tub of hot water, into which is put a little softening, No. 62; wring and dry.

96. ANOTHER METHOD FOR CHROME ORANGE.

Take 2 lb. sugar of lead, dissolved in water, and add to this lime-water, till the lead that is precipitated is dissolved; then work the goods in this for twenty minutes; wring out, and work for ten minutes in a solution of 1 lb. of chrome; wring out and pass twice through the lead and chrome in the same way; then raise by working in hot lime-water, as No. 95; wash in hot water with softening, and dry.

97. ANNOTTA ORANGE.

Heat the annotta solution, No. 37, to working heat—about 140° Fah.; work the goods in this for twenty minutes; wring tightly out, in order not to lose much stuff; wash in a couple of waters, and dry.

If this colour is passed through water made to taste sour by an acid, a very red orange, bordering on scarlet, is produced; but the colour is very fugitive.

98. SKY BLUE.

For light blues the goods should be bleached, Nos. 7 and 9; then to a tub of cold water, sufficient to work the goods in easily, add $\frac{1}{2}$ pint nitrate of iron, No. 15, and then work in this for twenty minutes; wring out, and pass through one tub of clean water. Into another tub of cold water add 4 oz. yellow prussiate of potash, in solution, and about a wine-glass full of vitriol; work the goods in this for fifteen minutes; wring out, and wash through cold water, in which is dissolved 1 oz. of alum; wring out, and dry.

To dye lighter or darker shades of sky blue, use less or more of the iron and yellow prussiate; or should the shade be too light after passing through the operations described, by repeating the operations through the same tubs, only adding an ounce more yellow prussiate, the shade will be deepened nearly double.

99. NAPOLEON BLUE.

The cotton to be bleached before dyeing. Into a tub of cold water add 1 imperial pint of nitrate of iron, No. 15,

and 2 gills muriatic acid, then add 3 oz. crystals of tin, No. 26, or a pint of double muriate, No. 60; stir well; and immediately enter the goods, and work for thirty minutes; wring out, and put directly into the prussiate tub, made up with water, into which is put a solution of 12 oz. yellow prussiate and 1 wine-glass full of muriatic acid; work in this for fifteen minutes, then wash out in clean water in which is dissolved .2 oz. alum. If a deeper shade of blue is required than these quantities will give, the goods are washed from the prussiate tub, without alum, in water, and passed again through the iron and prussiate, and then washed out, as above, with alum in last water.

100. ROYAL BLUE.

This is dyed in the same manner as the above; but the liquors are stronger—using 2 pints iron; 2 gills muriatic acid, and 4 oz. tin crystals, No. 26. The prussiate tub is made up by dissolving in it 1 lb. yellow prussiate of potash, and adding 1 wine-glass full of sulphuric acid and 1 glass full muriatic acid. All the other operations are the same as No. 99. If not sufficiently dark with putting once through, repeat.

101. LOGWOOD BLUE.

Dye first a light blue with the vat, No. 36, then lay in a hot decoction of 2 lb. sumach for several hours, and then keep working for fifteen minutes through water to which has been added 1 pint acetate of alumina (red liquor), and 1 pint acetate of iron (iron liquor); wash from this in two tubs

full of hot water, then work twenty minutes in a decoction of 2 lb. logwood; lift, and raise with $\frac{1}{2}$ pint red liquor; work ten minutes longer; wash, and dry.

102. INDIGO VAT BLUE.

If the goods be yarn they are wrought for fifteen minutes in the vat, No. 36, wrung out, the wringings put back into the vat, and the goods exposed for an hour to the air; if the blue be deep enough in colour, they are washed and dried; if not dark enough, they are passed again through the vat in the same way, repeating as often as the depth of shade requires. When the colour is dark, the goods are passed through a tub of water with as much sulphuric acid (vitriol) in it as makes it taste perceptibly sour, washed well and dried. For very light shades the yarn is bleached, but for ordinary and deep shades it is unbleached. Cloth dyed vat blue is generally stretched upon a frame, and then immersed into the vat with the frame, or made to pass over rollers under the liquor, to obtain an equality of dye over all the piece.

Care must be taken, whether in dyeing yarn or cloth in the blue vat, that the sediment or *sludge* at the bottom be not disturbed by agitation; for if the goods come into contact with it, the colour will be destroyed by being dirty and grey looking. When the dyeing in a vat is finished for the day, the vat is stirred up and allowed to settle all night. A vat should never be used until several hours after stirring.

103. CHROME GREEN.

Dye a blue by the blue vat, No. 36, about twice the depth of the sky blue pattern, No. 98, then work it twenty minutes through a solution of 1 lb. acetate of lead, prepared as No. 90, with soda or potash; wring out, and work for fifteen minutes in a tub with 6 oz. of chrome in it, then wash out and dry.

It will be observed that this kind of green is obtained first by dyeing a blue and then a yellow on the top of the blue; by the depth of either every variety of shade can be produced. The principal difficulty is, when a particular shade is required, to get the proper depth of blue; for after

the yellow has been dyed upon it, blue cannot be dyed on the top of the yellow by the vat. This difficulty can only be got over by experience.

The mode of dyeing yellow, No. 88, may be adopted upon the blue, but there is a great tendency to an unequal colour by this method.

This pattern is not produced by chrome, but is of a similar tint.

104. BARK GREEN ON YARN.

The goods are dyed a blue in the vat, No. 36, according to the shade required, and when washed are wrought for fifteen minutes in red liquor at 7° Twaddell; wring out, and put through a tub of hot water, then work for half an hour in a decoction of 3 lb. bark, and raise by adding $\frac{1}{2}$ pint of red liquor; work fifteen minutes, wash, and dry.

105. FUSTIC GREEN ON YARN.

Dye a vat blue, in No. 36; wash and wring, and then pass through the acetate of alumina, No. 46, at 6° Twaddell; wash through a tub of hot water, and then work for twenty minutes in a decoction of 4 lb. fustic; lift and raise with 2 oz. alum in solution, work fifteen minutes, wash, and dry.

106. BARK GREEN ON CLOTH.

The goods after being cleaped, not bleached, are wrought for ten minutes in red liquor at 7° Twaddell, wrung out, and passed through a tub of hot water, and then wrought for half an hour in a decoction of 3 lb. bark, lifted and raised with $\frac{1}{2}$ pint red liquor, and wrought ten minutes

longer, then lifted and drained. Into a tub of cold water add 5 gallons of chemic, No. 42; work the yellow in this for twenty minutes, wring out, and dry. Of course any depth of shade may be made in this way by varying the quantity of stuff used.

107. FUSTIC GREEN ON CLOTH.

Work the goods in acetate alumina, No. 46, at 6° Twad., and dry in a stove or hot chamber; then wet out in hot water, and work for twenty minutes through a decoction of 3 lb. fustic; lift, and raise with 2 oz. alum, in solution; work fifteen minutes; wring out, and then work in the chemic prepared as in No. 106; wring out, and dry.

108. GREEN WITH PRUSSIAN BLUE.

Dye a good Prussian blue, same way as sky, No. 98, according to the depth of green required; and then work ten minutes in acetate of alumina, red liquor, at 6° Twad.; wash in a tub full of warm water, and work for half an hour in a decoction of 3 lb. fustic; lift, and raise with 2 oz. alum, in solution; work ten minutes longer; wash, and dry.

Bark may be substituted for fustic in this green. If so, the bark should not be wrought very warm; and thus a finer tint is obtainable.

109. SAGE GREEN.

Dye a Prussian blue, same as sky, No. 98, and work ten minutes in a solution of 2 lb. alum; wring out, and work

fifteen minutes in a decoction of 1 lb. fustic; lift, and add a pint of the alum solution formerly used; work ten minutes, and then wash and dry.

110. OLIVE OR BOTTLE GREEN.

Dye a good shade of Prussian blue, No. 98; then mordant by working ten minutes in acetate of alumina (red liquor) at 7° Twad.; wring out, and wash in hot water; work for half an hour in a decoction of 3 lb. fustic and 1 lb. sumach; then add $\frac{1}{2}$ pint iron liquor, No. 16, and work fifteen minutes; then wash in one tub water having 2 oz. alum dissolved in it, and dry.

111. OLIVE OR BOTTLE GREEN.—ANOTHER METHOD.

Work the goods in red liquor at 7° Twad., wash in warm water, and work half an hour in a decoction of 3 lb. bark and 1 lb. sumach; lift, and add $\frac{1}{2}$ pint iron liquor, No. 16; work other fifteen minutes; wring out, and then work fifteen minutes in the chemic prepared as in No. 106; wring out of this, and dry.

112. OLIVE GREEN.

Dye a Prussian blue, No. 98, then work for ten minutes in red liquor at 6° Twad.; wash in hot water, and work in a decoction of 3 lb. bark and 1 lb. logwood; lift, and raise with $\frac{1}{2}$ pint of red liquor, and work ten minutes; wash from this, and dry.

A great variety of shades of green may be obtained by

varying the proportions of bark and logwood. Fustic may also be used instead of bark.

If the goods be yarn, a light vat blue may be dyed instead of the Prussian blue, and proceeded with afterwards in the same manner as above.

113. PUCE OR LILAC.

Work for an hour in red spirits, No. 29, made down to 2° Twaddell; wring out, and wash, then work half an hour in a decoction of 3 lb. of logwood, at working temperature, about 140° Fah.; lift up, and add 1 gill red spirits, No. 29; work for twenty minutes; wash from this, and dry. $\frac{1}{2}$ pint of red liquor, or 2 oz. alum, may be added to the logwood, as raising, instead of red spirits.

114. ANOTHER METHOD.

Work the goods for fifteen minutes in red liquor, at 7° Twaddell; wring out, and wash in one tub warm water, then work half an hour in a decoction of 2 lb. of logwood, at working heat; lift, and raise with $\frac{1}{2}$ pint red liquor, or

2 oz. alum; work ten minutes in this, and wash in a tub of lukewarm water; wring out, and dry.

115. LIGHT PURPLE OR ADELAIDE.

The goods are laid in a decoction of 2 lb. sumach, as No. 63, wrung out, and wrought half an hour through the spirit plumb, No. 33; wring out, and wash in clean cold water till no taste of acid is felt on the goods, and dry.

When working with the spirit plumb, it is best to take the plumb liquor into a tub or separate vessel, and work the goods in this, returning the liquor afterwards to the plumb tub.

116. ANOTHER METHOD.

The goods are laid in 2 lb. sumach, as No. 63, wrung out, and wrought for twenty minutes in red spirits, No. 29, at 2° Twaddell; wash well from this, then work in the spirit plumb, No. 33, in the same manner as No. 115; wash out till no taste of acid is on the goods, and dry.

117. PURPLE.

2 lb. of sumach are boiled, and the goods treated in the same way as No. 63; work in red spirits at 2° Twaddell for an hour, and wash in cold water; then work for half an hour in a decoction of 3 lb. of logwood, at working heat; then lift, and add 1 gill of spirits, No. 29, and work for ten minutes more; wash in cold water, and dry.

A variety of purple shades may be dyed by this process by slightly varying the proportions of the stuffs. If a browner tint is required, give a little more sumach; if

a bluer tint, less sumach, and increase the logwood, and raise with $\frac{1}{2}$ pint red liquor, or 2 oz. alum, instead of red spirits.

118. LAVENDER OR PRACH.

Work the goods for twenty minutes through the spirit plumb, No. 33, wring out, and wash in clean cold water till no taste of acid is felt, and dry.

119. LOGWOOD LILAO OR PUCE.

Dye the goods a good shade of Prussian blue, No. 98, then work for fifteen minutes in a decoction of 1 lb. of logwood, at working temperature; lift up, and add 4 oz. alum; work ten minutes, and then wash in cold water, and dry.

120. ANOTHER METHOD.

Dye a sky blue as No. 98, then in a tub of warm water add 1 gallon alum plumb, No. 34, and work in this fifteen minutes; wring out, and dry.

121. LIGHT LAVENDER.

To a tub of warm water add 2 gallons of alum plumb, No. 34, and work the goods in this for fifteen minutes; wring out, and dry. If a blue tint is required, add with the plumb $\frac{1}{2}$ pint of chemic, No. 42.

122. FRENCH WHITE.

For Pattern, see Safflower Lavender, No. 123.

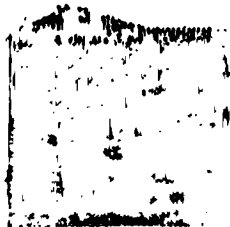
To a tub of hot water add 1 pint of alum plumb, No. 34,

and $\frac{1}{2}$ pint chemic, No. 42; work in this fifteen minutes; wring out, and dry.

123. SAFFLOWER LAVENDER.

Dye the goods a sky blue, No. 98, then dye a safflower pink on the top of the blue, No. 77, with 1 lb. safflower; but in dyeing the pink, the sulphuric acid must be added to the safflower liquor previous to the blue being entered into it, otherwise the alkali of the safflower will destroy the blue.

We need hardly add, that different depths of colour, and different hues, will be obtained by varying the shade of blue and the quantity of safflower. Deep blue and little safflower gives a lilac, or puce; while a light blue, such as No. 98, with 4 lb. safflower, will give a peach colour.



124. SAFFLOWER LAVENDER.—ANOTHER METHOD.

Dye a pink with 2 lb. of safflower, No. 77, then proceed and dye a sky blue over this, No. 98, and finish exactly as described for sky blue.

Of course the remarks made at No. 123, in reference to different shades, apply equally to this method; but more safflower is required by this method than the other.

125. IRON BUFF OR NANKEEN.

Take 2 lb. of sulphate of iron (copperas), and dissolve in warm water, and then add the requisite quantity of

water for working the goods; work in this for twenty minutes, and wring out, and put them immediately into a separate vessel filled with lime-water, No. 48, and work in this for fifteen minutes; wring out, and expose to the air for half an hour, when the goods will assume a buff colour.

If the colour is not sufficiently deep, this operation may be repeated, working through the same copperas solution, but using fresh lime-water each time; the goods are then washed through clean warm water, and dried.

126. ANOTHER METHOD.

Into a vessel with warm water add $\frac{1}{2}$ pint nitrate of iron, No. 15, and work the goods in this twenty minutes; wring out, and work for fifteen minutes in another vessel filled with warm water, to which has been added $\frac{1}{2}$ pint caustic potash or soda, Nos. 11 and 12; then wash through warm water, and if the colour is not deep enough, repeat the operation; wash again, wring out, and dry.

If a little soap be used in the last washing water of either of these two buffs, the colour is improved.

127. ANOTHER METHOD.

Add to a tub of water in which the goods are to be dyed, $\frac{1}{2}$ pint annotta, No. 36, and $\frac{1}{2}$ oz. bi-chromate of potash in solution; work the goods in this for fifteen minutes; lift them out, and add to the liquor $\frac{1}{2}$ oz. acetate of lead in solution, and work twenty minutes in this; wring out, and dry. By adding more of these stuffs, a variety of shades of light fawn or dark buffs may be dyed.

128. DRAB.

Work the goods for fifteen minutes in a decoction of $\frac{1}{2}$ lb. sumach; lift, and add 1 oz. copperas in solution and work for fifteen minutes; wash out in a tub cold water, then work for fifteen minutes in a decoction of 4 oz. fustic, 2 oz. limawood, and 1 oz. logwood; lift, and raise with 1 oz. alum in solution; work ten minutes longer, wring out, and dry.

A great variety of shades can be produced by this means, varying the proportion of the limawood, fustic, and logwood; and different depths by varying the quantities of sumach and copperas.

129. OLIVE DRAB.

Work fifteen minutes in $\frac{1}{2}$ lb. sumach, then add 1 oz. copperas, and work in this for fifteen minutes; wash in one tub water, and work in $\frac{1}{2}$ lb. fustic for twenty minutes, and raise with 1 oz. alum; work ten minutes, and dry out.

130. DRAB.

To a tub of hot water add 1 pint of annotta, No. 36, which gives a light salmon colour; then proceed with this exactly as No. 129, for olive drab; or by varying the last operations as No. 128, a great variety of drabs may be dyed.

131. STONE COLOUR.

Work the goods twenty minutes in a decoction of 1 lb. sumach; lift, and add 1 oz. copperas in solution; work

fifteen minutes, and wash in one tub cold water; then work ten minutes in warm water, to which $\frac{1}{2}$ pint alum plumb, No. 34, has been added; wring and dry.

This gives a reddish tint; but if this tint be not required, the alum plumb may be dispensed with, using $\frac{1}{2}$ oz. alum in the water.

132. CATECHU STONE DRAB.

Work the goods for fifteen minutes in 2 pints catechu, No. 38, in hot water; lift, and add 2 oz. copperas in solution; work for fifteen minutes, and wash in one tub of water. Into another tub of warm water, add a decoction of 2 oz. logwood; work the goods in this for ten minutes; lift, and raise with $\frac{1}{2}$ oz. alum; work ten minutes longer; wring out, and dry.

133. CATECHU DRAB.

Work the goods for fifteen minutes in hot water, to which has been added 1 pint catechu, No. 38; then lift, and add 1 oz. copperas; work ten minutes, and wash out, and dry.

A variety of tints may be obtained by *topping* with a little different woods, as No. 128, proceeding in the same manner.

SILK DYEING.

PRELIMINARY REMARKS.

IN the introductory part, page 3, we gave the method of preparing silk for dyeing in the hank; but a great portion of the dyeing required by the amateur is re-dyeing, such as ribbons, handkerchiefs, dresses, shawls, &c. The first operation with goods to be re-dyed is steeping in a strong solution of soap at nearly a boiling heat for a few hours, in order to remove stains of oil or grease; they are afterwards washed in water, and if the colour remaining upon them after this operation be light and equal, and the colour wanted be dark, then no more is required; but if unequal, they should be put into a sour, No. 14, for fifteen minutes, then washed out, and proceeded with for the colour required.

The following quantities of dyestuffs given in those receipts are for dyeing 5 lb. weight of silk. In cases where the silk is very hard-spun, as in some ribbons and dresses, a little more dyestuff may be used than the quantities given, and also a little more time. Some kinds of goods will be more bulky than others of the same weight; in such cases, less or more water may be used accordingly. The quantity of water must always be sufficient to allow the goods to be quite loose when immersed under the surface.

When goods are washed from the dye, it is always in cold water, except otherwise mentioned in the receipt.

DYEING.

134. BLACK.

Work for an hour in a solution of 8 oz. of copperas, and wash well out in cold water; then work an hour in a decoction of 4 lb. of logwood, adding to it $\frac{1}{2}$ pint of urine; lift out, and add to the logwood liquor 2 oz. copperas in solution; work fifteen minutes; wash, and dry. •

This will give a good black, not very deep. If a deep black is required, add to the copperas solution, 2 oz., by measure, nitrate of iron, No. 15; indeed, for re-dyes, it will be better to add this at all times. If a blue shade is required, instead of adding urine, dissolve a little white soap in the logwood liquor, and add no copperas.

135. FULL DEEP BLACK.

Work an hour in 1 lb. copperas and 2 oz. nitrate of iron, No. 15; wash and work for an hour in a decoction of 5 lb. logwood, and 1 lb. fustic; lift, and add 2 oz. copperas, work ten minutes; wash, and finish.

If the colour is not deep enough, add a little more logwood before raising with the copperas.

136. FRENCH BLACK.

Work an hour in 1 lb. copperas and 4 oz. alum; wash well, and then work an hour in a decoction of 4 lb. logwood,

in which a little white soap has been added ; wash out, and finish.

137. BLUE BLACK BY PRUSSIAN.

Dye a deep Prussian blue as described No. 98, and work from the prussiate for half an hour in 8 oz. copperas ; wash well from this in cold water, and then work for half an hour in a decoction of 2 lb. logwood, using neither urine nor soap in it ; lift and add a little of the copperas solution with which the goods were mordanted ; work other ten minutes, then wash and dry.

138. DEEP HAT BLACK, OR PARIS BLACK.

Work the silk fifteen minutes in a decoction of 2 lb. fustic and 1 lb. bark ; lift, and add in solution 6 oz. verdigres and 6 oz. copperas ; work other fifteen minutes, and then sink the whole under the surface, and let it steep for several hours, say overnight ; lift and wash from this, then make a decoction of 5 lb. logwood ; dissolve in it as much white soap as will make a lather, and work in this for an hour ; wash out, and dry.

139. BROWN.

Dye an orange with annotta, No. 37 (see orange) ; then work for fifteen minutes in a solution of 8 oz. copperas ; wash from this in two waters, and then work half an hour in a decoction of 3 lb. fustic, 8 oz. logwood, and 1 pint archil liquor ; lift, and add $\frac{1}{2}$ pint alum solution ; work ten minutes, wash and dry.

1 lb. of brazil or peachwood may be substituted for the archil liquor, with nearly the same results. A variety of this shade of brown may be dyed by varying the quantity of each stuff.

140. BROWN.

Dye an orange by annotta, No. 37 (see orange); wash out, and then work for twenty minutes in a decoction of 3 lb. fustic, 8 oz. sumach, 8 oz. peachwood; lift up, and add 3 oz. of copperas in solution; work other fifteen minutes, wash out in two waters, using $\frac{1}{2}$ pint of alum solution in the last water.

If the particular tint required is not obtained by the above proportions, it may be given in the water with the alum, using it a little warm. If yellowness is required, add fustic. If redness is required, add peachwood. If depth or blueness, add logwood.

A great many particular hues of brown may be dyed by this method; as for instance, by using only fustic and sumach in the second operation, a California brown is obtained, etc., as just referred to, so that any intelligent person will easily regulate his colours and tints.

141. RED BROWNS.

Dye a deep orange by annotta, No. 37 (see orange); wash out, then work for fifteen minutes through the plumb liquor, No. 33; wash well, and dry.

Particular tints may be given by adding either logwood, peachwood, or fustic in the last washings, as described in last receipt.

142. ANOTHER METHOD.

Steep the silk in an alum solution of 8 oz. to the gallon for an hour, and wash out in warm water; then work half an hour in a decoction of $1\frac{1}{2}$ lb. fustic, $1\frac{1}{2}$ lb. peachwood, 8 oz. logwood; lift, and add 1 pint of the alum solution, work for ten minutes; wash and dry.

143. CHOCOLATE BROWN.

Steep the silk for an hour in alum, 1 lb. to the gallon water; wash once in warm water, and then work for half an hour in a decoction of 3 lb. peachwood and 1 lb. logwood; lift, and add 1 pint of the alum solution; work in for fifteen minutes; wash out, and dry.

Deeper shades of chocolate are obtained by using a little

less peachwood and more logwood, in equal proportions. A little fustic, say 4 oz., may be added, which will give a still deeper hue if required.

144. BRONZE BROWN.

Work for half an hour in a decoction of 8 oz. fustic, to which 4 oz., by measure, of archil liquor has been added; then lift, and add 2 oz. solution of copperas; work fifteen minutes, wash in cold water, and finish.

145. PINK.

Prepare the safflower as described, Nos. 43 and 44; then take a quantity of solution equal to 1 lb. of safflower originally used; add to this solution 1 oz., by measure, vitriol; enter the silk, and work for half an hour; then wash in a vessel with warm water in which about 1 oz. cream tartar has been dissolved; wring out, and finish. Lighter or darker shades may be dyed by using less or more safflower—when more is used, a little more time will be required.

If safflower extract be used, which is simply the red colouring matter of safflower, No. 44, precipitated by an acid, add about 2 gills of the extract to warm water, with half wine-glass full of vitriol; stir well; work the goods in this, and proceed as above.

146. SAFFLOWER ROSE AND CRIMSON.

Dye the goods first a good shade of lavender by working it in archil, see No. 160; it is then dyed with the safflower above the lavender, exactly as the pink, but using more dye; from $\frac{1}{2}$ lb. to 1 lb. safflower to each lb. of silk will give from a rose to a crimson, using a corresponding quantity of vitriol to raise the colour, and requiring from an hour and a half to two hours' time working; it is finished by washing in warm water made to taste with cream tartar, the same as the pink.

147. SAFFLOWER SCARLET.

Dye the silk first a good shade of orange by annotta, No. 37 (see orange); wash from this, and then enter into the safflower, proceeding in the same manner as for rose or crimson. For a good rich scarlet, it will require as much safflower as the crimson, 1 lb. to the lb. of goods, and finished in the same manner.

148. COCHINEAL CRIMSON.

To every gallon of water used, add about 2 oz., by measure, bi-chloride of tin, Nos. 27 and 28; allow any sediment to settle, and take the clear solution, and apply heat; when warm, work the goods in it for an hour or more.

Boil in a bag 2 lb. of cochineal, by suspending it on the surface of the water for half an hour; add this to the proper quantity of water for working the goods, the whole being at hand heat; wring the silk from the spirits, and work it in this cochineal solution for half an hour, when it is let steep for several hours, keeping well under the liquor; wash well out of this in cold water. If the shade is not blue enough, a little cochineal dissolved in ammonia, No. 49, may be added to the water; and after working in this for ten minutes, wring out, and dry.

149. COMMON RED.

Make a decoction of 2 lb. peachwood and 1 lb. fustic, No. 39; work the goods in this for fifteen minutes; lift up, and add 4 oz., by measure, red spirits, No. 29; work again fifteen minutes; wash in cold water, and finish.

A variety of tints may be dyed in this way, by varying the proportions; and by adding a little logwood, clarets, and such shades, can be produced; but these common colours do not stand the air well.

150. COCHINEAL PINK.

This colour is dyed in the same manner, as No. 148, only using much less cochineal; about $\frac{1}{2}$ lb. will make a good colour. Different shades of pink, rose, and crimson can be dyed by this method, by varying the quantities of stuff used.

151. COCHINEAL SCARLET.

Dye a deep orange by annotta, No. 37 (see orange); then wash, and proceed in the same way as for crimson, passing through the spirits, and then cochineal, as stated above.

152. COMMON CRIMSON.

Into a copper or stoneware vessel put some of the peachwood plumb, No. 35; work the goods in it for half an hour; then wash out in cold water until no taste of plumb is perceptible in the cloth; wring, and dry.

153. COMMON SCARLET.

Dye the goods an orange by annotta, No. 37 (see orange); wash in water, and then work in the peachwood plumb in the same way as dyeing common crimson; wash out, and dry.

154. RUBYS, MARCONS, ETC.

Take 1 lb. of cudbear and boil for fifteen minutes in a bag; work the silk in this solution for half an hour. If the shade required be of a bluish tint, lift, and add 3 oz., by

measure, liquid ammonia; work ten minutes, and wring, and dry.

If the shade required be of a red hue, lift, and add 2 oz., measure, red spirits, No. 29; work ten minutes; wash out, and dry.

If a brown hue is wanted, use along with the cudbear a decoction of 4 oz. fustic; work in this, and raise with 2 oz. red spirits, as above.

If a deep violet hue is required, use along with the cudbear a decoction of 4 oz. logwood; work in it, and raise with 2 oz. red spirits, as above.

155. SKY BLUE.

To 1 pint of sulphate of indigo, No. 40, add 2 or 3 gals. boiling water; then put into this a piece of woollen cloth, such as an old blanket; after steeping for a day, take it out and wash in cold water.

If the sky blue required be very light, make up a vessel with warm water, about blood heat, steep the blue cloth in this for a few minutes, and wring out, when as much blue will be dissolved off as will dye the silk; add an ounce of alum in solution, and work the silk in this for twenty minutes; wring out, and dry.

If the blue required be deep, then, to the warm water in which the blanket is put, add 1 oz. of pearl ash, and proceed as detailed; but before adding the silk, a few drops of vitriol may be added with the alum to neutralise the alkali.

If indigo extract be used, No. 41, then the blanket or woollen cloth is not required, but to the requisite quantity of water add $\frac{1}{2}$ oz. of extract, with 1 oz. of alum in solution, and work the silk as stated; less or more of the extract is used according to the depth of shade required.

156. PRUSSIAN BLUE—SKY.

To a sufficient quantity of cold water to work the goods, add $\frac{1}{2}$ pint of nitrate of iron, No. 15; work in this for twenty minutes, then wash out in cold water.

Into another vessel of cold water add 3 oz. yellow prussiate of potash in solution, and 1 oz., by measure, of vitriol; work through this for ten minutes, then wash in cold water in which an ounce of alum has been dissolved, and finish.

157. ROYAL BLUE.

Into a vessel with cold water add 2 pints of nitrate of iron, No. 15; then take 1 pint water and $\frac{1}{2}$ pint muriatic acid, and to this add 3 oz. crystals of tin, No. 26; when dissolved, add this to the vessel containing the iron, or 1 pint double muriate of tin, No. 60; stir well, and enter the goods immediately, and work for half an hour.

Into another tub dissolve 8 oz. yellow prussiate, and add to it 2 oz., by measure, of vitriol; the goods are wrung out the iron solution and put directly into the second vessel with the prussiate, working for fifteen minutes; then wash out in cold water, having 2 oz. of alum dissolved in it, and finish.

Should the shade not be sufficiently deep, instead of washing in the alum water, they may be put back into the iron solution, and again through the prussiate in the same way, and work the same time as first, only adding 2 oz. yellow prussiate before entering the second time into that vessel; then finish as stated.

Deeper shades are obtained by using more iron and tin, or by giving several dips.

Some wash out the iron solution before going into the prussiate in one water, and also out the prussiate before being put back to the iron; the shade by this will not be so deep with the same stuff, but there is less risk of an unequal colour.

158. ANOTHER METHOD, OR NAPOLEON BLUE.

Put into a vessel with cold water 2 pints nitrate of iron, No. 15, and 2 pints proto-chloride of tin, No. 26; work in this for half an hour; into another vessel with water put in 10 oz. yellow prussiate dissolved, 1 lb. alum, and 4 oz., by measure, muriatic acid; wring the goods out the iron solution, and put into the prussiate without washing, and work fifteen minutes. If not deep enough, pass again through the iron, and then the prussiate, adding 2 oz. more prussiate; wash from this, and dry. The goods may be softened a little by mixing oil and tartaric acid, and adding a little of this to the water; the goods should be dried hot.

If red prussiate of potash be used instead of yellow, as some prefer, then the iron used in first operation should be proto-muriate, No. 18.

This shade of blue has a wine colour tint, and is much admired.

159. LAVENDER.

Into as much water as will work the goods in easily, put 1 pint of plumb liquor, No. 33; stir well, and work the goods in this for twenty minutes, then wash out in cold water, and dry.

Darker or lighter shades can be dyed, by using less or more of the plumb liquor.

If a blue tint of lavender is required, add to the plumb liquor solution, before putting in the goods, 2 or 3 drops of sulphate of indigo or extract, No. 40 or 41, and proceed as stated.

160. LAVENDER.—ANOTHER METHOD.

Into a vessel with warm water as hot as the hand can bear, dissolve a little white soap, enough to raise a lather; then add 1 gill archil liquor, and work the goods in this for fifteen minutes; wring out, and dry.

Boil 1 oz. of cudbear, and add the solution to the soap and water, instead of archil, which will give a lavender having a redder tint than that with the archil. If a still redder

shade of lavender be required, the soap may be dispensed with.

161. WINE COLOUR, VIOLET, LILAC, ETC.

Into a copper pan or stoneware vessel, put as much of the plumb liquor, No. 33, as will work the goods in; then work in this for twenty minutes; wash out in two or three waters, or until the goods have no taste of the plumb, then dry.

If a rich blue tint is required, add to the plumb, 1 oz., by measure, sulphate of indigo, or extract, No. 40 or 41. If a red tint is required, dye the cloth first a lavender by cudbear, No. 160, without soap; then work through the plumb liquor, without indigo.

The plumb liquor used for this colour is not thrown away; it is either put back into the stock tub, or into another vessel kept for that purpose, when it may be used over again. If indigo has been used, it must not be put back into the stock plumb, or it will give the whole a blue shade; all such mixture should be kept separate.

162. FRENCH AND PEARL WHITE.

Into hot water dissolve a quantity of white soap, as much as makes a lather, and then add about $\frac{1}{2}$ oz., by measure, archil; work the goods in this for ten minutes, and finish out the soap.

A little cudbear may be used instead of archil, less or more according to the shade required.

163. ANOTHER METHOD.

Into a vessel of cold water, add about 1 oz., by measure,

- of plumb liquor ; work the goods for ten minutes ; wash out, and dry.

For these shades the goods should be perfectly white previous to dying.

164. WELD, YELLOW.

Work the silk for an hour in a solution of alum, about 1 lb. to the gallon, wring out, and wash in a vessel with warm water. Boil 2 lb. weld, strain the liquor, and work the alumed silk in this for half an hour, then add 1 pint of the alum solution to the weld bath, and return the silk ; work for ten minutes longer, and wring out and dry.

This gives a rich lemon yellow ; by adding more weld, deeper shades are produced ; or by adding a little annotta, No. 37, amber and straw tints are obtained. •

165. BARK AND FUSTIC YELLOW.

Work the silk for an hour through an alum solution of the strength of 1 lb. to the gallon water ; then wash out in warm water, and wring. Take 2 lbs. of bark, prepared as No. 39, and work the alumed silk in this solution for half an hour ; lift, and add 1 pint of the alum solution ; work ten minutes longer, and wring out, and dry. By using fustic instead of bark a very rich yellow is also produced.

166. ANOTHER METHOD.

Alum the silk as above, and boil 3 lb. bark in a bag ;

then work the silk through this decoction, while very hot, for half an hour; lift, and add 2 oz., by measure, red spirits, No. 29; work for fifteen minutes, wash out in cold water; then work ten minutes in a solution of white soap; wring out of this, and dry.

167. GOLD AND STRAW.

Into warm water with white soap, add 2 pints annotta liquor, No. 37; work in this fifteen minutes; wash out, and then work twenty minutes through a decoction of 8 oz. bark; lift and add 1 oz., by measure, red spirits, No. 29; work other ten minutes, wash out, and finish.

Different tints of these colours may be dyed by varying the quantity of annotta bottom and bark.

168. SALMON, FLESH, NANKEEN, BUFF, ETC.

Make a solution of white soap in warm water, and to this add 1 pint of annotta liquor; work twenty minutes, wring out, and finish. If the shade is not deep enough, add a little more annotta.

If a red tint is required, such as salmon or flesh colour, the goods are washed out the soap, and finished in cold water, in which 2 oz. alum is dissolved.

169. ORANGE.

The silk is wrought for fifteen minutes in a strong solution of annotta, No. 37, made warm; then wash in warm water, and dry.

The annotta made up for silk should be with soft soap.

instead of potash or soda, or only a very little of these alkalies should be added

170. YELLOW DRAB.

Into a vessel with warm water add 1 pint annotta liquor, No. 37; work in this for fifteen minutes, and wash; then work other fifteen minutes into a decoction of $\frac{1}{2}$ lb. sumach and 1 lb. fustic; lift up, and add 4 oz. copperas in solution and 1 oz. alum; work ten minutes, and wash in cold water, and dry.

A variety of shades of drab may be dyed in this way by varying the proportions of the stuff, and adding with the fustic small quantities of logwood and peachwood.

171. DRAB.

Work the goods for fifteen minutes in a decoction of 8 oz. sumach and 8 oz. fustic; lift, and add 4 oz. copperas; work twenty minutes, and wash out in cold water. In another vessel with warm water add $\frac{1}{2}$ pint archil liquor; work fifteen minutes in this, and dry out.

If a greenish tint be required, add a decoction of 4 oz. fustic to the archil, and $\frac{1}{2}$ oz., by measure, of chemic, No. 42. If a purple tint is required, add, instead of the chemic, 1 oz. of alum in solution.

A great variety of tints may be produced by a slight variation of some of these ingredients.

172. SLATE OR STONE COLOUR.

Into a decoction of 1 lb. sumach, 4 oz. fustic, and 4 oz. logwood, No. 39, work the silk for half an hour; lift, and

add a solution of 4 oz. copperas ; work other thirty minutes ; wash in cold water, and finish.

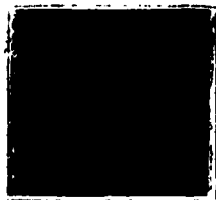
A variety of tints can be produced by this method, by varying the proportions of the stuffs.

173. GREEN.

Steep for an hour in an alum solution of 1 lb. to the gallon ; wash in warm water, and work for thirty minutes in a decoction of 6 lb. fustic ; then add 2 oz., by measure, indigo extract, No. 41 ; work other thirty minutes ; wash, and finish.

Should the shade be too yellow, as the extract often varies in quality, add more extract to the fustic before finishing.

Deeper and lighter shades are dyed by this method, by using less or more of each stuff.



174. ANOTHER METHOD.

Work for forty minutes in a decoction of 4 lb. fustic ; lift, and add 1 lb. alum in solution, and 2 oz., by measure,

of indigo extract; work for half an hour in this; wash out in cold water having in it $\frac{1}{2}$ pint of the alum solution, No. 173, and finish.

175. SAGE GREEN AND PEA GREEN.

Steep the silk for an hour in an alum solution of 8 oz. to the gallon water, and then wash out in warm water; boil 4 lb. ebony wood chips for an hour; take the clear, and work the silk in it for thirty minutes; lift, and add $\frac{1}{2}$ oz. indigo extract; work ten minutes; wash in cold water having $\frac{1}{2}$ pint of alum solution in it, and dry.

Care has to be taken in adding the extract, lest the quantity given be too much for the shade required; it may be better to add less, and if found not enough, lift, and add more.

176. BOTTLE GREEN.

Dissolve 2 lb. alum and 1 lb. copperas; work the silk in this for an hour, and wash out in warm water; then work for half an hour in a decoction of 6 lb. fustic; lift, and add 2 oz., by measure, indigo extract, No. 41; work twenty minutes; wash out, and finish.

177. ANOTHER METHOD.

Proceed exactly as described for common green; but add 1 lb. of logwood to the 6 lb. of fustic, and operate in every way the same as No. 173.

If a deeper shade be required, a little more logwood may be added.

178. OLIVE.

Work the silk for half an hour in a solution of 1 lb. copperas and 4 oz. alum; wash out in hot water, and then work half an hour in a decoction of 2 lb. fustic and 4 oz. logwood; lift, and add $\frac{1}{2}$ pint alum solution, No. 173, or 2 oz. dissolved; work ten minutes in this; wash, and dry.

If the shade required have more of a green hue than pattern, add a little chemic, No. 42, to the last water, and work ten minutes, and dry out.

179. LIGHT OLIVE.

Dye a light Prussian blue (see sky blue); then work for twenty minutes in a decoction of 2 lb. fustic and $\frac{1}{2}$ pint archil liquor; lift, and raise with $\frac{1}{2}$ pint alum solution, No. 173, or 1 oz. dissolved; work ten minutes, and finish.

WOOLLEN DYEING.

PRELIMINARY REMARKS.

THE preparation of woollen for dyeing has been given, p. 4. In the following receipts the quantity of dyestuffs given are for 10 lb. of woollen, whether yarn or cloth, and the quantity of liquid used to be sufficient to allow the goods plenty of room in the liquor. The proper quantity of water for a certain quantity of goods will soon become familiar with a little practice.

For re-dyes every care should be taken to remove all grease or oil first, or no good dye can follow. This is done by steeping and scouring in soap and soda, No. 2. If the remaining colour be unequal or dark, the goods are steeped or wrought for a little in a sour made up by *sal nixon* (bi-sulphate of potash), 2 oz. to the gallon water.

Woollen is always dyed hot; the liquid generally being near to the boiling point, which necessitates its being dyed in a boiler. Iron vessels are in general not used for this purpose. Copper, and copper with tin, is most generally used. The dyestuffs, such as ground wood, are generally put into the boiler and the goods wrought with it, but it is cleaner to make a decoction and use the clear liquor.

All washings to be in cold water, except warm be specified in the receipt.

DYEING.

180. BLACK.

Work for one hour in a bath with 8 oz. bichromate potash (chrome), 6 oz. alum, 4 oz. fustic; lift and expose to the air for a short time; wash well, and then work for one hour in another bath with 4 lb. logwood, 4 oz. barwood, 4 oz. fustic; lift and add 4 oz. copperas in solution; work half an hour in this, and then wash, and dry.

181. BLACK.

Work for twenty minutes in a bath with 8 oz. camwood; lift, and add 8 oz. copperas; work other twenty minutes; then withdraw the fire from the boiler, and submerge the goods in the liquor overnight; then wash out. Into another bath, with 5 lb. logwood and 1 pint chamber-lye, work for an hour; lift, and add 4 oz. copperas; work in this half an hour longer; wash, and dry.

182. BLUE BLACK.

Dye first a good dark Prussian blue, No. 197, or royal blue; then proceed in the same manner as in No. 180, using only the half of the stuff named there. If the blue is very deep, instead of operating as No. 180, they may be wrought for half an hour in a decoction of 4 lb. logwood; then add to this 1 oz. of red chromate of potash; work half an hour longer; wash, and dry.

183. BROWN.

Work for half an hour in 8 oz. of chrome; lift, and expose till cold; then into a new bath work an hour in 2 lb. fustic, 4 oz. madder, 3 oz. cudbear, 4 oz. tartar, 2 oz. logwood; lift out, and dry; or it may be washed before drying.

184. YELLOW BROWN.

Work for an hour in the following bath: 2 oz. bichromate of potash (chrome), 2 oz. argol, 2 oz. alum; wash from this bath; then work about forty minutes in another bath made up with 2 lbs. fustic, 1 lb. madder, 8 oz. peachwood, 4 oz. logwood; wash out of this, and dry. This gives a very beautiful brown; and a great variety of tints and shades may be made by varying the quantities of the last bath, with the same preparation as the first bath.

185. BROWN.

This is a more easily dyed brown than last, although not giving the same tint. Work for an hour in a bath made up with 2 lb. fustic, 2 lb. madder, 1 lb. peachwood, 4 oz. logwood; then lift and add to the bath a solution of 2 oz. copperas, and work half an hour in this; wash out, and dry.

186. BROWN.

Work for an hour in a bath of 4 lb. fustic, 2 lb. camwood, $\frac{1}{2}$ lb. logwood; lift, and add to the bath 4 oz. copperas; work half an hour in this; wash, and dry.

187. CRIMSON.

Work in a bath for one hour with 1 lb. cochineal paste,* No. 49, 6 oz. dry cochineal, 1 lb. tartar, 1 pint protochloride of tin; wash out this, and dry.

188. SCARLET.

Work for an hour in a bath with 1 lb. tartar, 2 oz. dry cochineal, 8 oz. sumach, 8 oz. fustic; wash out, and dry.

189. RED.

Work half an hour in a bath with 1 oz. bichromate of potash, 1 oz. alum; wash out this through cold water; then work for half an hour in another bath with 3 lb. peach or limawood; lift and add 1 oz. alum; work in this for twenty minutes; wash, and dry.

190. CLARET RED.

Work for an hour in 5 oz. camwood; lift out and expose until the goods are well drained and cold; in the interim add to the bath with the camwood 4 oz. copperas, 2 oz. alum, 8 oz. logwood; work the goods in this for half an hour; wash, and dry.



191. LAC SCARLET.

• Work for half an hour in a bath with 1 lb. tartar, 8 oz. sumach, 2 lb. lac; lift and add about a gill of bi-chloride of tin, No. 27, and work in this for half an hour; lift, wash, and dry.

192. PINK.

Work one hour in a bath with 1 lb. tartar, 8 oz. alum, 1 lb. cochineal paste, 1 gill measure of red spirits, No. 29; wash out in cold water, and dry.

193. YELLOW.

Work for half an hour in a bath with 3 oz. chrome, 2 oz. alum; lift and expose till well cooled and drained; then work for another half hour, without previous washing in another bath with 5 lb. fustic; wash out, and dry.

194. YELLOW.

Work for twenty minutes in a bath with 8 oz. tartar, 8 oz. alum; lift, and add to the bath 2 lb bark, 8 oz. sumach,

8 oz. fustic, 1 pint red spirits; work in this for forty minutes; wash out, and dry.

195. ORANGE.

Work for forty minutes in a bath with 2 lb. sumach, 3 oz. cochineal dry, 1 lb. fustic, 8 oz. tartar, 1 pint red spirits; wash out this, and dry.

196. SKY BLUE.

Work in a bath for half an hour with 8 oz. argol, 1 lb. alum, 1 gill indigo extract, No. 41; wash out this, and dry.

Different depths of shade may be made by varying the quantities of indigo extract.

197. ROYAL BLUE.

Work for twenty minutes in a bath with 1 lb. yellow prussiate of potash, and lift; then take $\frac{1}{2}$ pint nitrate of iron, No. 15, and add to it 1 oz. of the crystals of tin, No. 26.

or 1 pint double muriate of tin, No. 60; stir well for a few minutes, and then add this mixture to the bath, and work the goods in this for half an hour; wash out, and dry.

Different shades of this may be dyed by varying the quantities of all the ingredients.

198. ANOTHER METHOD.

Into the required quantity of water, put 1 quart of muriate of iron, No. 18, and add to it 1 pint of double muriate of tin, No. 26; work in this for half an hour; lift, and work half an hour in a bath with 4 oz. red prussiate of potash. If the colour is not deep enough, repeat this through the same stuff, adding 2 oz. more red prussiate; then wash out in cold water, and dry.

199. PIERON BLUE.

Work in a bath for forty minutes with 2 oz. chrome (bichromate of potash), 4 oz. alum, 1 oz. tartar; wash from this in cold water, and then work for half an hour in another bath with 3 lb. logwood; lift and add 1 oz. verdigris; work for fifteen minutes, and wash, and dry.

200. OAK OR APPLE GREEN.

Work for half an hour in a bath with 1 oz. chrome, 1 oz. alum; wash through cold water, and then work for half an hour in a second bath with 2 lb. fustic and 8 oz. logwood; wash, and dry.

A variety of this shade can be obtained by varying the proportions and quantities.



201. GREEN.

Work for fifteen minutes in a bath with 5 lb. fustic, 2 oz. argol, 5 oz. alum; lift, and add $\frac{1}{2}$ gill indigo extract; and then work for half an hour, and dry.

If the green seem too yellow, a little more extract of indigo may be added.

202. FAST GREEN.

This is first dyed blue in the indigo or woad vat, according to the depth of green required, and then work for an hour in a bath with 4 lb. fustic, 2 lb. alum, and dry out.

By dyeing the vat blue lighter than is required for the green, and adding to the bath with the fustic a little logwood, will give the required depth and a good shade; but the colour is not so fast.

203. BOTTLE GREEN.

Work for an hour in a bath with 2 oz. chrome and 4 oz. alum; lift out, and expose to the air for some time till the goods are cold; then work for an hour in a second bath with 3 lb. fustic, $1\frac{1}{2}$ lb. logwood; wash out, and dry.

204. INVISIBLE GREEN.

Work for an hour in a bath with 3 oz. chrome, 4 oz. alum; lift, and expose to the air for some time; then work for an hour in a second bath with 2 lb. fustic, $3\frac{1}{2}$ lb. logwood; wash out, and dry.

By comparing these two last receipts, it will be seen that the different shades are produced by varying the proportions of the same stuffs, and will serve as a guide to the amateur.

205. OLIVE.

• Work for an hour in a bath with 10 oz. fustic, 8 oz. logwood, 4 oz. madder, 2 oz. peachwood; lift, and add to the same bath 4 oz. copperas in solution, and work for half an hour, and dry.

206. OLIVE.

Work for an hour in a bath with 4 oz. chrome, 2 oz. alum; lift and expose for some time to the air; then work for an hour in a bath with 3 lb. fustic, $1\frac{1}{2}$ lb. camwood, 1 lb. logwood; lift out, and dry.

207. PURPLE.

Work the goods half an hour in a bath, with 1 oz. chrome, 1 oz. alum; lift out, and wash in cold water, and then work half an hour in a bath, with 2 lb. logwood, 1 lb. peachwood; lift, and add 1 oz. of alum in solution; work in this for twenty minutes; wash, and dry.

If a light and redder shade be required, use less logwood, and more peachwood; and if a darker shade, more of each.

208. WINE COLOUR.

Work the goods for an hour in a bath, with 4 lb. cudbear; and dry.

If a darker shade be required, give more cudbear; if the tint be required bluer, add after half an hour's working, 1 gill ammonia or hartshorn; if a redder tint is required, add a wine-glass full of muriatic acid.

If the acid be added, the goods should be washed before drying.

209. LIGHT VIOLET.

Work for an hour in a bath, with 4 oz. cudbear, 4 oz. logwood, 2 oz. barwood, or camwood, 2 oz. peachwood; lift, and add 2 oz. alum in solution, and work half an hour, and dry.

210. PUCK.

Work in a bath for one hour, with 10 oz. logwood, 1 oz. camwood, 8 lb. cudbear; lift, and add 2 oz. copperas in solution; work half an hour, and dry.

211. GREEN DRAB.

To the dye bath, add 1 oz. bichromate of potash, $\frac{1}{2}$ oz. alum, $\frac{1}{2}$ oz. tartar, and work the goods in this half an hour; lift out, and wash through cold water. Make up a new bath of water, and add 4 oz. logwood, 2 oz. fustic, 1 oz. barwood, or $\frac{1}{2}$ oz. peachwood; work the goods again through this second bath half an hour; wash, and dry.

Shades of this can also be varied by using different proportions of stuffs.

212. BROWN DRAB.

° To the dye bath, add 2 oz. ground madder, 1 oz. peachwood, 2 oz. logwood, 6 oz. fustic, and work in this for thirty minutes; lift up, and add 3 oz. of copperas in solution; mix well, and work the goods in this for other thirty minutes; wash and dry.

This shade can be greatly varied, either by altering the quantity of the stuffs, or the proportions of any of them; if a redder tint be required, add more peachwood or madder—the latter gives the drab hue; if more yellow, add fustic; if more slate or black, add logwood, and *vice versa*.

213. GRAY DRAB.

Dissolve $\frac{1}{2}$ oz. of bichromate, and add to the required quantity of water; work in this for half an hour; lift the goods, and add 1 oz. of logwood; work again for half an hour; lift out, wash and dry.

Different shades of this drab may be made by varying the quantities of the dyestuffs.

214. SLATE DRAB.

Into the proper proportion of water, add 1 oz. peach or lima-wood, 2 oz. logwood, $\frac{1}{2}$ oz. fustic; work in this for twenty minutes, and then lift out, and add to the dye bath 1 oz. sulphate of iron (copperas) in solution; stir well, and work in this for another half hour; lift out, and expose to the air for a short time; wash and dry.

A great variety of shades of drab may be dyed, by varying the quantities, and the proportions of the dyestuffs.

215. SLATE.

Work for half an hour in a bath, with 8 oz. logwood, 1 oz. fustic; lift, and add to the bath a solution of 1 oz. alum, $\frac{1}{2}$ oz. copperas; work in this half an hour; wash, and dry.

Different tints of this colour can be obtained by varying the stuff; if a more blue tint be required, use less alum and more copperas; if more to the purple, less fustic and more alum; and so by a very little practice any particular tint can be dyed.

216. BLUE BY WOOLLEN BLUE VAT.

The blue vat No. 36 is not used for woollen or silk; for these fibres there are two sorts of vats used, to set which, and keep in order, requires great experience, and many extensive dyehouses do not possess them. The dyer who keeps these has always something he does and prefers different to his neighbour. A very good method for setting a woad vat is as follows:—Into a large vessel, capable of being heated to about 180° Fah., put, for every 20 gallons water, 12 lb. best woad, finely chopped, 1 lb. ground indigo, 3 oz. madder, 3 oz. bran; mix well, and let them steep from sixteen to twenty hours at bloodheat; when they begin to ferment, and the colour of the solution becomes yellowish; a little lime is now added, and the vat stirred; this stirring should be continued every four or five hours, and either lime, madder, or potash, added in small portions according to the appearance of the solution; when in good order, there should be on the surface a thin floating layer of indigo, and when the liquor is blown upon, it should have an amber tint; if too yellow, a little lime is added. It requires several days before the vat can be dyed with.

To dye silk blue in this vat the liquor should only be lukewarm, to dye woollen it should be heated to about 170° Fah. The heat must not be applied to the bottom of the vat, which would raise the sediment, but to the sides above the sediment.

217. ANOTHER BLUE VAT FOR WOOLLEN.

For every 20 gallons water add 5 oz. ground indigo, 8 oz. potash, 3 oz. madder, and 4 oz. bran; keep the solution at a heat of 140° Fah.; after twenty-four hours the whole will have begun to ferment, then add 2 oz. madder; stir, and allow the whole to settle, after which the vat is ready for use. Woollen is dyed in this in the same way as last, heating the vat to 170°, working the goods in it for a short time, then exposing to the air for an hour. If the shade is deep enough, wash and finish; if not dark enough, give another dip.

MIXED FABRICS.

DYED TWO COLOURS.

MIXED fabrics of cotton and woollen, as coburgs and damasks, are very common; these are either dyed all one colour, or the cotton and woollen are dyed of different colours. This last is seldom done, except with new goods, or in cases where very light coloured goods are wanted a dark shade, in which case a light and dark colour may be dyed. The process for doing this is very simple. As the process used for woollen will seldom produce the same colour on cotton, the two have to be dyed separately. For most colours it is necessary to dye the woollen first, and then the cotton; in a few the cotton is dyed first. In most cases, the processes we have given will serve the purpose, as for instance—

218. GREEN AND PINK.

The woollen is first dyed a green, by the process No. 201, and then the cotton is dyed pink, by the process No. 77.

219. GREEN AND CRIMSON.

Dye the woollen by working for an hour in 2 lb. tartar, 4 lb. alum, 6 lb. fustic, and then add $\frac{1}{2}$ pint indigo extract, No. 41; wash out, and lay overnight in 6 lb. sumach; work half an hour in red spirits, No. 29, made to 2° Twaddell; wash and work for an hour in 5 lb. peachwood at hand heat; raise with alum; wash, and finish.

220. BLUE AND ORANGE.

First dye the cotton a blue by the blue vat, No. 36;

wash, and then dye the woollen by working one hour in 2 lb. tartar, 8 oz. cochineal, 2 lb. fustic, and 2 pints bi-chloride of tin, No. 27; wash from this, and dry.

In this way almost any two colours may be dyed upon cotton and woollen, although woven together, by proceeding as the receipt for the colour required on each sort of fibre; and except as in 220, where cotton is dyed by the blue vat, and consequently fast, the woollen is always to be dyed first. The same rule is applicable to silk and woollen. The two have to be dyed separately, although in many cases the silk becomes more dyed during the dyeing of the woollen than the cotton is.

A mixture of silk and cotton when required two colours, has also to be done in the same manner; but it is much more difficult, and cannot be done with all kinds of colours; it is a process, however, seldom required.

MIXED FABRICS.

DYED ONE COLOUR.

SHOULD the mixed fabrics be required all of one colour, the same double process has often to be adopted, especially when the fabrics are cotton and woollen; as, for instance—

221. BLACK ON COTTON AND WOOLLEN.

The woollen is dyed first, as No. 180, and then, to dye the cotton, the goods are laid in sumach, and dyed as No. 63; and so on for any colour of these mixed fabrics.

222. BROWN ON COTTON AND WOOLLEN BY ONE PROCESS.

Work the goods for two hours in catechu, same as No. 71; then work for an hour at boiling heat with 8 oz. chrome and 2 oz. tartar; lift out, and work an hour in 2 lb. fustic and 8 oz. cudbear; wash, and dry. Should a deeper shade be required, or a shade more to the chocolate hue, add with the cudbear 4 oz. logwood.

223. BLACK ON SILK AND WOOLLEN BY ONE PROCESS.

Work an hour in a solution of 8 oz. tartar, and 8 oz. copperas, and wash out; work for fifteen minutes in a decoction of 4 lb. logwood; lift, and add 1 oz. bichromate of potash; work half an hour, and dry.

224. BLACK ON COTTON, SILK, AND WOOLLEN BY ONE PROCESS.

Steep for six hours in 2 lb. of sumach, then work for an

- hour in a solution of 6 oz. tartar, 6 oz. bluestone, and 6 oz. copperas; wash from this, and work half an hour in a decoction of 4 lb. logwood; lift, and raise with 1 oz. copperas; work ten minutes; wash, and dry.

Should a very deep black be required, add 1 lb. of bark with the logwood; all else the same.

225. DRABS ON COTTON, SILK, AND WOOLLEN, BY ONE PROCESS.

Work half an hour in 8 oz. sulphate of iron, and 4 oz. tartar; lift, and drain; then work for half an hour in 4 oz. logwood, and 1 oz. chrome; wash out, and dry.

By varying the quantity of these stuffs, or by using a little fustic or peachwood in the last bath, a great variety of shades of drab, slates, or fawns, may be produced, the different fibres being equally dyed.

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